

Application Number 10/657,867
Amendment dated March 12, 2007
Reply to Office Action of December 12, 2006
Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of claims:

1-20. (Cancelled)

21. (Currently Amended) A bipolar transistor comprising:
a semiconductor substrate of a first conductivity type;
a collector region of a second conductivity type, which is defined by first and second
isolation regions on the semiconductor substrate;
a first base semiconductor layer of the first conductivity type formed of a silicon
germanium (SiGe) layer, which extends across the upper surface of the collector region to the
upper surface of the first and second isolation regions;
emitter insulating layers formed on the first base semiconductor layer, wherein the
emitter insulating layers define an emitter junction portion on the first base semiconductor layer;
an emitter region of the second conductivity type formed on the emitter junction portion
on the first base semiconductor layer to contact the first base semiconductor layer through the
emitter junction portion, wherein the emitter region has sidewalls being in contact with sidewalls
of the emitter insulation layers in a region which is defined by emitter insulating layers formed
on the first base semiconductor layer;
second base semiconductor layer patterns of the first conductivity type formed of a
silicon layer, which is formed on portions of the first base semiconductor layer except for
portions of the first base semiconductor layer having the emitter region and the emitter insulating
layers, wherein the second base semiconductor layer patterns are spaced apart from the emitter
region by the emitter insulating layers positioned between the emitter region and the second base
semiconductor layer patterns;
base ohmic layer patterns formed on the second base semiconductor layer patterns;
an emitter electrode formed on the emitter region;
base electrodes formed on the second base semiconductor layer patterns at both
sides of the emitter electrode;

first and second insulating layer patterns formed between the first and second isolation regions, respectively, and the first base semiconductor layer, under the base electrodes; and

first and second silicon layer patterns formed between the first and second insulating layer patterns, respectively, and the first base semiconductor layer.

22. (Previously Presented) The bipolar transistor of claim 21, wherein the second base semiconductor layer patterns are formed of an epitaxial growing layer.

23. (Previously Presented) The bipolar transistor of claim 21, wherein the first conductivity type is p-type and the second conductivity type is n-type.

24. (Previously Presented) The bipolar transistor of claim 21, further comprising first selectively ion implanted collector (SIC) regions of the second conductivity type, which are formed at portions near the surface of the collector region and adjacent to the first and second isolation regions.

25. (Previously Presented) The bipolar transistor of claim 24, further comprising a second SIC region of the second conductivity type, which is formed in a portion of the collector region under the emitter region.

26. (Previously Presented) The bipolar transistor of claim 21, wherein the base ohmic layer patterns are formed of metal silicide.

27. (Previously Presented) The bipolar transistor of claim 26, wherein the base ohmic layer patterns are formed of one of titanium silicide and cobalt silicide.

28. (Previously Presented) The bipolar transistor of claim 21, wherein the first and second insulating layer patterns are formed of one of oxide layers and nitride layers.